

What is claimed is:

1. An insulated gate bipolar transistor comprising:
a first semiconductor layer of a first conductivity

type;

5 a second semiconductor layer of a second conductivity
type formed on a top surface of said first semiconductor
layer;

a base layer of the first conductivity type formed on
a top surface of said second semiconductor layer;

10 a plurality of gate electrodes each of which is
buried in a trench with a gate insulation film interposed
therebetween, said trench being formed in said base layer
to a depth reaching said second semiconductor layer from a
surface of said base layer, each said gate electrode
15 having an upper surface of a rectangular pattern with
different widths in two orthogonal directions, said gate
electrodes being disposed in a direction along a short
side of the rectangular pattern;

20 emitter layers of the second conductivity type formed
in the surface of said base layer to oppose both end
portions of each said gate electrode in a direction along
a long side of the rectangular pattern;

a first main electrode in contact with said emitter
layers and said base layer; and

25 a second main electrode formed at a bottom surface of
said first semiconductor layer.

2. The transistor according to claim 1, wherein said

emitter layers are formed as impurity diffusion layers opposing three side faces at the both end portions of each said gate electrodes in the long side direction.

3. The transistor according to claim 2, wherein said
5 emitter layers are impurity diffusion layers formed independently of each other at the both end portions of each said gate electrode in the long side direction.

4. The transistor according to claim 2, wherein said
emitter layers are impurity diffusion layers continuously
10 formed to extend ~~and~~ overlie said plurality of gate
electrodes while opposing the both end portions of each
said gate electrode in the long side direction.

5. The transistor according to claim 2, wherein said
gate electrodes include multiple ones aligned in the long
15 side direction also, and wherein said emitter layers are
impurity diffusion layers formed to continue between two
neighboring gate electrodes while opposing respective end
portions of said two neighboring gate electrodes in the
long side direction.

20 6. The transistor according to claim 2, further
comprising:

a coupling portion configured to connect said
plurality of gate electrodes together at their central
portions in the long side direction, said coupling portion
25 being the same in structure as said gate electrodes.

7. The transistor according to claim 6, wherein said
emitter layers are impurity diffusion layers formed

independently of each other at the both end portions of each said gate electrode in the long side direction.

8. The transistor according to claim 6, wherein said emitter layers are impurity diffusion layers continuously formed to extend and overlie said plurality of gate electrodes while opposing the both end portions of each said gate electrode in the long side direction.

9. The transistor according to claim 6, wherein said gate electrodes include multiple ones aligned in the long side direction also and wherein said emitter layers are impurity diffusion layers formed to continue between two neighboring gate electrodes while opposing respective end portions of said two neighboring gate electrodes in the long side direction.

10. The transistor according to claim 1, further comprising:

15 a coupling portion configured to connect said plurality of gate electrodes together at their both end portions in the long side direction, said coupling portion being the same in structure as the gate electrodes.

20 11. The transistor according to claim 10, wherein said emitter layers are impurity diffusion layers formed independently of each other at the both end portions of each said gate electrode in the long side direction.

25 12. The transistor according to claim 10, wherein said emitter layers are impurity diffusion layers formed to continue along said coupling portion while opposing the

both end portions of each said gate electrode in the long side direction.

13. The transistor according to claim 10, wherein said gate electrodes include multiple ones aligned in the 5 long side direction also and wherein said emitter layers are impurity diffusion layers formed to continue between two neighboring gate electrodes while opposing respective end portions of said two neighboring gate electrodes in the long side direction.